

CLAIMS

1. A discoloration removal cleaning agent for titanium and titanium alloy building materials, which comprises at least a water-soluble inorganic acid salt, 5 an organic acid or organic acid salt, a surfactant, a hydrophilic oxygen-containing hydrocarbon solvent, and water.

2. The discoloration removal cleaning agent for titanium and titanium alloy building materials according 10 to claim 1, wherein said cleaning agent also satisfies either or both of the following conditions (1) and (2):

(1) Said cleaning agent comprises one or more types of thickener;

15 (2) The viscosity of said cleaning agent (measured at room temperature with a Brookfield viscometer) is 100-10,000 mPa·s.

3. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to claim 1 or 2, wherein said cleaning agent also 20 satisfies either or both of the following conditions (3) and (4):

(3) Said cleaning agent comprises one or more types of fluoracarbon resin and one or more types of polishing material;

25 (4) Said cleaning agent comprises one or more types of discoloration inhibitor.

4. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to claim 3, wherein the content of inorganic fluorine 30 compound salts is 0.5-5.0 wt%.

5. The discoloration removal cleaning agent for

titanium and titanium alloy building materials according to any one of claims 1 to 4, wherein the organic acid or organic acid salt is at least one selected from the group consisting of formic acid, oxalic acid, citric acid, malic acid, lactic acid, tartaric acid, succinic acid, fumaric acid, gluconic acid, hydroxybutyric acid, 5 ethylenediaminetetraacetic acid, hydroxyethylenediaminetetraacetic acid, diethylenetriaminopentaacetic acid, 10 hydroxyethanediphosphonic acid, or salts such as sodium, potassium and ammonium salts of these organic acids.

6. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 5, wherein the content of the 15 organic acid or organic acid salt is 2-15 wt%.

7. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 6, wherein the surfactant has an HLB (hydrophilic-lipophilic balance) value of 12 or 20 greater.

8. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 7, wherein the organic acid or organic acid salt is at least one selected from the 25 group consisting of anionic surfactants such as polyoxyethylenealkyl ether acetic acids and their sodium salts, polyoxyethylenealkyl ether phosphoric acids and their sodium salts, dialkylsulfosuccinic acids and their sodium salts, and nonionic surfactants such as polyoxyethylenealkyl ethers, polyoxyethylenealkylallyl ethers and polyoxyethylenopolyoxypropylenealkyl ethers. 30

9. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 8, wherein the content of the surfactant is 2-10 wt%.

5 10. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 9, wherein the hydrophilic oxygen-containing hydrocarbon is at least one selected from the group consisting of ethylene glycol,

10 polyethylene glycol, propylene glycol, lower molecular weight polypropylene glycol, hexylene glycol, 1,3-butanediol, glycerin, methyldiglycol, methyltriglycol, ethyldiglycol, ethyltriglycol, butyldiglycol, butyltriglycol and N-methylpyrrolidone.

15 11. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 10, wherein the content of the hydrophilic oxygen-containing hydrocarbon is 5-20 wt%.

20 12. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 11, wherein the thickener is at least one selected from the group consisting of polyvinyl alcohol, methyl cellulose, hydroxyethyl cellulose, guar gum, xanthan gum, carboxyvinyl polymer, 25 polyethylene oxide and polyvinylpyrrolidone.

13. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 12, wherein the content of the thickener is 0.2-1.5 wt%.

30 14. The discoloration removal cleaning agent for titanium and titanium alloy building materials according

to any one of claims 1 to 13, wherein the discoloration inhibitor is at least one selected from the group consisting of mercaptobenzothiazole-based, triazole-based, imidazole-based and thiourea-based discoloration 5 inhibitors.

15. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 14, wherein the content of the discoloration inhibitor is 0.1-1.5 wt%.

10 16. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 15, wherein the fluoracarbon resin is at least one selected from the group consisting of polytetrafluoroethylene, polytetrafluoroethylene-15 hexafluoropropylene copolymer and polyvinylidene fluoride.

17. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 16, wherein the content of the fluoracarbon resin is 0.3-2.0 wt%. 20

18. The discoloration removal cleaning agent for titanium and titanium alloy building materials according to any one of claims 1 to 17, wherein the polishing material is at least one selected from the group 25 consisting of diamond, emery, garnet, corundum, ruby, silica sand, silicon carbide, alundum, cerium oxide, zirconium oxide, γ -alumina and chromium oxide.

19. The discoloration removal cleaning agent for titanium and titanium alloy building materials according 30 to any one of claims 1 to 18, wherein the content of the polishing material is 10-30 wt%.

20. The discoloration removal cleaning method for titanium and titanium alloy building materials, wherein discolored sections of a titanium or titanium alloy building material are coated with the discoloration 5 removal cleaning agent according to any one of claims 1 to 19 and allowed to stand for a prescribed period of time, and then said cleaning agent is removed by water washing of the coated sections.

21. The discoloration removal cleaning method for 10 titanium and titanium alloy building materials according to claim 20, wherein the discoloration removal cleaning agent coated on the discolored sections of the titanium or titanium alloy building material is removed by high-pressure water washing (approximately 30-100 kg/cm², 15 approximately 10-50 L/min) or low-pressure spray water washing (equal to or less than approximately 10 kg/cm², approximately 5-30 L/min) after standing for a prescribed period of time.

22. The discoloration removal cleaning method for 20 titanium and titanium alloy building materials according to claim 20 or 21, characterized in that said coated sections are subjected to polishing after said coating, if necessary after standing for a prescribed period of time, before water washing.

25 23. The discoloration removal cleaning method for titanium and titanium alloy building materials according to claim 22, wherein the discoloration removal cleaning agent is removed by water washing after polishing.

24. The discoloration removal cleaning method for 30 titanium and titanium alloy building materials, according to any one of claims 20 to 23, wherein the

coating coverage of the discoloration removal cleaning agent is 50-200 g/m².